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A. I. A. File No. 7-A
Methods of Waterproofing



Improving and Extending the Uses of Concrete with Con-Tex*



Acorn Building, 6th Avenue, New York City. Basement walls prepared by Bonding Con-Tex for Waterproofing Coat.

Producing Locked-on Waterproofing Surfaces on Concrete

Bulletin No. 6 ~ Series 1928

CONCRETE SURFACE CORPORATION
342 Madison Avenue New York City

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*Use of this slogan by permission of Portland Cement Association

What Con-Text is and how it is used to Surface Concrete



CON-TEXT is a free-flowing, quick-drying liquid, applied to forms, or, in top-surface work and in stucco work or mortar-finish work where there are no forms, applied directly to the surface of the fresh concrete, stucco or mortar, for the purpose of producing a

superior and permanent surface finish thereon.

Con-Text, whether brushed on forms or applied directly, surfaces concrete or stucco or mortar by preventing the setting of the cement *at the surface only* and to a predetermined depth. This depth of action is dependent upon the "grade" or strength of Con-Text used as described in detail in the text of this brochure.

When the interior of the concrete or mortar has hardened in the normal manner, this sand-like, unset surface produced by the Con-Text action is readily removed by brushing-off, thus exposing the aggregates either for beauty or for bonding or other utilitarian purposes.

Con-Text has no continuing action. Con-Text is not acid or harmful, so that it may be used with wood or steel forms. Con-Text will not affect old concrete or set and hardened concrete.

Con-Text when applied before final set and used according to directions, surfaces any concrete made with any good sand, stone, gravel or slag or any other aggregate commonly employed, and with any Portland cement or with Special cements, such as quick-hardening Portland cements, or White Portland cement or Lumnite cement.

The only labor required is that of applying Con-Text, either to forms or directly to surfaces and brushing off the loose material at the surface kept unset by Con-Text after the unaffected cement has hardened.

The only tools required are a three knot bristle roofer's brush or a standard bristle paint brush for apply-

ing Form Con-Text; a soft bristle brush or a spray machine, either hand or power, for applying Top Surface Con-Text or Stucco Con-Text; and wire brushes or (in the case of floor-slab tops, roadway surfacing and like uses) wire brooms for removing loose surface material as a finishing operation.

The two general kinds of Con-Text bear names that are self-explanatory.

Form Con-Text is used by painting it on forms before concrete is cast. It dries quickly and forms a *hard, weather-resistant coating* on the forms, whether they are steel, or wood, or other materials.

Top Surface Con-Text is used by applying it by soft brushes or by a spray, directly on the concrete itself, as in surfacing roadways, floor slabs, plaza areas, etc. It dries more slowly but *forms a soft film* over the concrete, which may be easily brushed off at the proper time.

Stucco Con-Text is a variety of Top Surface Con-Text, specially adapted for use on stucco. It is sprayed on or brushed directly on the stucco after screeding and troweling and gives a very light reveal.

Both Form Con-Text and Top Surface Con-Text are made in four "grades" or "strengths" each. These grades are: *Light, Medium, Heavy and Bonding grades.*

By these several strengths or "grades," a reveal, or depth of uncovering suited to the size of aggregate of the concrete, may be readily had.

Bonding Grade Con-Text, as its name indicates, reveals stone to a depth best suited for bonding of materials later to be applied, such as plaster, stucco, tiling, cork, waterproofings, etc., etc.

Stucco Con-Text is made in one grade only, suited to a very light reveal as a surface finish on stucco.

All of the above kinds and grades of Con-Text are supplied in 1 gallon and 5 gallon containers only.

* * * * *

Specifications for Con-Text and the uses of Con-Text treated herein are at the end of this brochure.

Specifications for concrete are on the back page. These specifications will well repay any study devoted to them and will be found practical in the field for any and all uses of concrete.

NOTE: The 1928 Series of Brochures on Con-Text and on Concrete Construction comprise the following:

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| No. 1—Producing Texture and Color in Concrete Construction. | No. 5—Producing Permanent Stucco Work on Concrete. |
| No. 2—Producing Bonding Surface on Concrete for Plaster Bond, Stucco Bond, Floor-topping Bond, etc. | No. 6—Producing Locked-on Waterproofing Surfaces on Concrete. |
| No. 3—The Con-Text System of All-Concrete Construction for Buildings. | No. 7—Producing Plaster Bond Surfaces for Plastering on Concrete. |
| No. 4—Surfacing Roads and Pavements with Con-Text. | No. 8—Producing Bonded Concrete Floor Surfaces free from Cracking, Dusting and Scaling. |

Any or all of these Copyrighted Brochures may be had on application to

CONCRETE SURFACE CORPORATION, 342 Madison Avenue, New York City



Foundations of Calvary Baptist Church at Howell, Miss. Prepared for Mortar Waterproofing by the use of Bonding Con-Tex.

Waterproofing Concrete by the Con-Tex Method

CONCRETE is a wonderful structural material in thousands of ways. Not least is it wonderful in its ability to resist water and water action when perfectly made. A perfectly made concrete needs no waterproofing.

But concrete is made commercially in great quantity by methods and by agencies which are known to be far from perfect. Deviations of commercial concretes from the laboratory ideal must therefore be expected. Further, construction joints or junctions of like character in the construction often furnish planes through which water may directly pass.

Experience has proved it advisable, therefore, to give to commercial concrete an added protection by means of supplemental agents. These supplemental agents are preferably surface applied. By their own qualifications, they manifestly should insure against the actual passage of water; and should also, as far as practicable, make impossible any absorption of water by the concrete.

Actual Leaks and Natural Absorption An actual leak through a mass of concrete usually occurs because of some joint as above noted, or through some segregation of the materials. This segregation may be a segregation of the stone, so that the mass is honeycombed. In this case, the mass will, of course, pass water freely. Or, the segregation may be a gathering together in

pockets of greater or less extent of the fine materials alone, with little or no stone or sand, in which latter case there are porous spots of chalky material, which commonly are called "laitance" or muck; and these will pass water, less freely, perhaps, but none the less surely.

These are defects which may occur even with the most conscientious of constructors due to a variety of causes which may be unnoticed at the time of pouring, and may remain unnoticed and unknown until water comes through them into the finished structure, because, when forms were stripped, they were obscured by the form skin and remained unseen.

Needless to say, an asphaltic coat, or other coat, relied upon as a supplemental protective agency over such porous and defective areas will have no real value.

The Danger of Leakages Normally pure waters from one source or another, leaking through the mass at either honeycomb or porous spots or at joints may be merely an inconvenience, even though serious in ultimate loss. But hostile waters, such as waters contaminated with factory wastes, may cause an actual and increasing disintegration due to their passage which is more than annoying, inasmuch as corrosion of the concrete and corrosion of the steel may result. Certainly, security from all points of view



Foundation Wall of Residence with Asphaltic Waterproofing Locked on a Bonding Con/Tex Surface.

lies in the keeping out of all waters, whether hostile or friendly and from whatever source they may come.

The Absorptive Power of the Skin of Concrete But actual leakage is not the only consideration. Water can enter and destroy in other ways.

For instance, the skin surface of concrete is always thirsty for water, inasmuch as it is composed so largely of cement, and cement, as is known, is avid for water at all times—certainly over a period of fifty years and possibly more. This thirsty skin of cement sucks in water, and by a peculiar process and form of capillary attraction, that is stated by some investigators to actually serve as a sort of atomic pump, forcing water back into the mass under a pressure of several atmospheres, the skin serves to saturate and over saturate the whole mass of the concrete, never to its betterment and oftentimes to its injury and the injury of steel as well.

But even putting aside all theories and all differences of opinion, certain it is that all concrete is more or less absorptive toward water. And certain it is, that the skin of concrete does not decrease this absorption to such a degree that it may be relied upon for full security under all conditions and in all varieties of service.

Insulating the Concrete by Applied Coatings The source of intruding water may be the natural moisture of the soil or it may be actual immersion in bodies of water, as in waterfront structures and the like.

Certain it is that regardless of the origin of this water, it is necessary as well as wise practice to protect all concrete as far as possible by some applied medium, whether this medium be bituminous or whether it be an applied plastic waterproofing of special density.

Plastic Waterproofings Applied on the Surface Skin The surface skin, or form skin of concrete has a natural repugnance for applied materials of almost any character.

If plastic waterproofings of a cementitious nature are applied, it is well known that hacking or bush-hammer removal of this skin surface must first be done, if any reliance whatsoever is to be placed upon the permanence of the union between the concrete and the applied materials. Nor in fact is this mechanical surface roughening to be depended upon, unless it is done with the utmost thoroughness and unless further, substantial areas of clean aggregate surfaces are exposed by this mechanical operation, for it is well-established fact that "no plastic material will bond with the skin of set and hardened concrete, but that all plastic material will bond with clean sand and clean stone surfaces."

For lack of knowing a better way, a great deal of labor and money has been expended in hacking or bush-hammering the surfaces of concrete to secure this mediocre bond between applied plastic waterproofings and concrete; and it is a distinct advance in the art to have available the surfacing material called "Con/Tex," which is a means whereby this necessary surfacing operation can be better performed by applied science than it can by brute strength.



Piling, with revealed Surface, ready for application of Asphalt Protective Coat.

Bituminous Waterproofings Applied on the Surface Skin

When it is attempted to place bituminous coatings over the skin surface of concrete, substantially the same bonding difficulties described above are encountered. The bituminous coating does not enter into and unite with the concrete itself in a dependable manner. Furthermore, with the "blotting-paper nature" of this skin underneath the bituminous coating, there is a tendency of this skin to draw water in through the bituminous coating and to pass it on into the concrete.

Furthermore, if this bituminous coating is applied to the outside of a structure or to structural members, as for instance, to piling, or to tunnel linings or the like, abrasions of greater or less severity frequently occur. Even the abrasion of flowing water, is sufficient after a little time to dislodge this coating to a large degree; and a dislodging or injuring of any part of the coating makes it ineffectual over an area longer than that of the actual abrasion.

Locking on Protective Coatings

But if the surface skin above referred to on any structure or structural member is removed and the aggregates are exposed as in any Con-Texed surface, where clean-stone surfaces are exposed with a sufficiently deep etch between the stones, then either the plastic or the bituminous type of waterproofing application may be cheaply and effectively applied to concrete, with full assurance that neither failure of bond, nor abrasions from any source will dislodge it or injure it. The degree of protection thus obtained is dependent solely on the value of the applied coating itself as a water resister.

In this type of protection, it is to be noted that the protective coating is thickest where it is needed—i.e.—over the absorptive mortar; and that it resides in little wells of sensible and dependable thickness over this mortar and between the exposed, but firmly-bedded aggregates.

How Con-Tex Acts Con-Tex in surfacing concrete, prevents the setting of the surface layer of cement on any concrete. If then, when forms are removed, this surface layer is brushed away, it is obvious that the aggregates of the concrete, firmly bedded in the hard-set concrete beneath, are presented as an outward surface on the concrete, whether it is a unit such as a pile, or whether it is a massive casting, such as a dam section, or a foundation.

Value of Locked-On Waterproofings This surface of exposed stone is of supreme value in the sure protection of any concrete construction.

In the first place, more than eighty percent of the total surface area presented to the water is impermeable and non-absorptive stone and only twenty percent is of possibly absorptive mortar, in place of the one hundred per cent absorptive area presented by the usual form skin.

Secondly, if a plastic mortar is to be applied, there is a full-area exposure of rough surface ready for bond; and 80% or more of this full rough area is composed of clean stone to which as is amply proven, the applied plastic will permanently unite as though the plastic had been cast integral with the mix.



How to Specify CON-TEX

It is always best to specify Con-Tex by name.

The following form is commonly used:

Form Surface Waterproof Bond Work "All surfaces of Form-Cast concrete indicated on the plans or in the specifications or otherwise des-

ignated to be surface finished to receive applied waterproofing, shall obtain a revealed stone surface for this purpose by the use of Form Con-Tex, Bonding Grade, as made and supplied by the Concrete Surface Corporation, 342 Madison Avenue, New York City.

"This Form Bonding Con-Tex shall be applied to all areas of forms where such surfaces are required, in an even coat before casting the concrete, and care shall be taken to completely cover all areas with the Con-Tex. The Con-Tex shall be allowed to dry thoroughly before being exposed to rain, weather or the elements.

"After the concrete has set, the loosened surface of the concrete shall be removed by wire brushes immediately after the forms are taken down. All loosened sand or cementitious material shall be thoroughly removed by this wire brushing to secure a full roughened area of cleanly exposed coarse aggregates, ready for bond with the applied waterproofing material.

"All forms on re-use for further exposed aggregate surfaces for waterproofing purposes shall be cleaned of old concrete or mortar and then recoated throughout such areas with Form Bonding Con-Tex before concrete is again poured against them."

Top Surface Waterproof Bonding Work "All top surfaces of concrete indicated on the plans or in the specifications or otherwise designated to be surface-

finished to receive either mastic, or asphaltic or mortar waterproofing coats or like applied materials, shall obtain this surface by the use of Top Surface Con-Tex, Bonding Grade, as made and supplied by the Concrete Surface Corporation, 342 Madison Avenue, New York City.

"All surfaces that are indicated on the plans or in the specifications, or otherwise designated to be surface finished for the reception of waterproofing materials by exposing aggregates, shall be given an even coat or coats of Top Surface Con-Tex by spraying or brushing on or by other approved means, and prior to the hard set of the concrete, taking care to completely cover all areas with the Con-Tex.

"After the body of the concrete has set, the loosened material at the surface affected by Con-Tex shall be immediately removed by wire brooms or by other effective and approved means; and the surface so exposed shall then be thoroughly brushed and broomed until full roughened areas of cleanly exposed aggregates are obtained ready for bond with the applied waterproofing materials."



How to Specify CON-TEX IN PUBLIC WORK

Where Trade Names are Not Permissible

"All concrete surfaces indicated on the plans or in the specifications or otherwise designated to be surfaced or surface-finished for bond with applied waterproofing materials shall be surface-finished for this purpose by the use of an approved liquid material painted on the forms before placing concrete in form work, or spread directly on the concrete in top surface work, or where so directed, to obtain full area, rough surfaces of cleanly revealed aggregate, on all such concretes as are to be waterproofed.

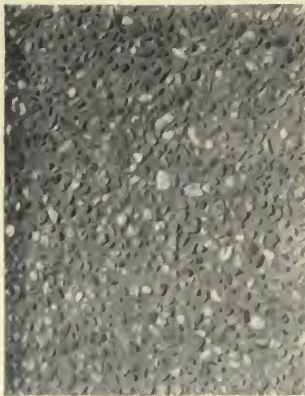
"The material used to produce this surface finish shall be an approved liquid coating applied to the forms, or in top surface work, applied to the concrete, before it has set; and this approved coating shall meet the following requirements: It shall be composed of a colloidal base carrying active materials; which latter shall operate only after coming in contact with the alkaline fluids of the concrete. This coating liquid shall not contain free acid; shall not contain any ingredient that will injure the aggregate, the reinforcement or the forms, and there shall be no after-effects injurious to the concrete or to applied materials. All surfaces, or forms for surfaces that are specified to be roughened bonding surfaces obtained by exposing aggregates, shall be given an even coat or coats of this liquid, taking care to completely cover all areas.

"Where such coating is applied to forms, after removal of forms, the loosened surface of the concrete shall be immediately removed with wire brushes or wire brooms or other effective and approved means until a full area rough bonding surface of cleanly exposed aggregates is obtained; and, at the architect's or engineer's discretion, the concrete shall then be thoroughly washed down with water."

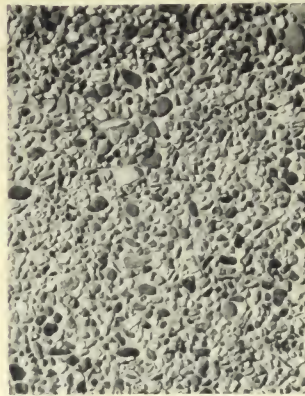


Surfaced Concrete Fence, Interboro Rapid Transit Yards, New York City.
D. C. Serber, Constructor

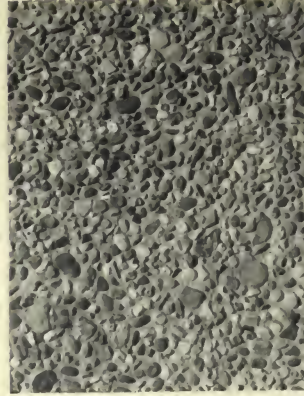
Coarse Stone Mixture Examples



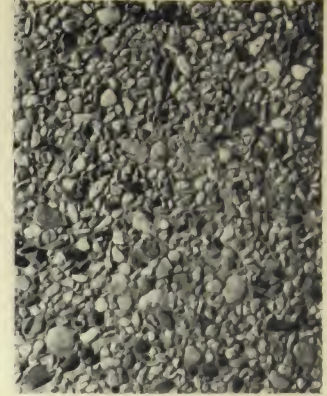
No. 1
Nearly 1 : 2 : 4
(Not enough stone)



No. 2
Mix—1 : 2 : 4½
(Better)



No. 3
Mix—1 : 2 : 5
(This mix best)



No. 4
Mix—1 : 2 : 6
(Too much stone)

Specifications for Concrete

UNIFORMITY in concrete is of the utmost importance. To secure uniformity, endurance, impermeability and high strength, we recommend that concrete, of whatever kind and for whatever purpose, be specified and proportioned on a basis of:

"One part cement, two parts sand and all the stone the mix will comfortably carry, with enough water to give a mushy consistency."

The above specification always works. It allows for any stone (whether crushed stone or gravel) for any size of stone or any changes in stone supplied, as well as for the characteristics of the sand used, which may change from hour to hour, and for job conditions as well.

We further recommend that specifications provide as follows:

"All concrete shall be deposited evenly and continuously in forms. It shall not be spaded away from forms, but shall be well puddled; and shall be run up in a continuous pour to full height of forms by placing bulkheads at such intervals that a full day's work will consist of the quantity contained between bulkheads and to full height of forms."

"All bulkheads shall be coated with Form Bonding Con-Tex, and a clean-stone bonding surface shall be obtained at the end of each section, so that the abutting section shall thoroughly bond to and with each section previously poured."

Fine Stone Mixture Examples



No. A
1 : 2 : 4½
(Fair)



No. B
1 : 2 : 5½
(Better)



No. C
1 : 2 : 6
(Best)